Adverse Adolescent Reproductive Health Outcomes After Pelvic Inflammatory Disease

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Objective: To compare longitudinal adolescent and adult reproductive outcomes after pelvic inflammatory disease (PID).

Design: Secondary analysis of longitudinal data from the Pelvic Inflammatory Disease Evaluation and Clinical Health study.

Setting: A large multicenter randomized clinical trial assessing PID treatment strategies in the United States.

Participants: Eight hundred thirty-one female patients aged 14 to 38 years with a diagnosis of PID.

Main Exposure: Adverse longitudinal outcomes were compared in adolescents (≤19 years) and adults (>19 years).

Outcome Measures: Primary outcome measures included recurrent sexually transmitted infection at 30 days, recurrent PID, chronic abdominal pain, infertility, pregnancy, and times to recurrent PID and pregnancy. Cox proportional hazards modeling was used to examine the effect of young age on times to pregnancy and recurrent PID.

Results: Adolescents were more likely than adults to have positive results of sexually transmitted infection testing at baseline and at 30 days. There were no significant group differences in chronic abdominal pain, infertility, and recurrent PID at 35 or 84 months, but adolescents were more likely to have a pregnancy at both time points. Adjusted hazard ratios (95% confidence intervals) also demonstrated that adolescents had shorter times to pregnancy (1.48 [1.18-1.87]) and recurrent pelvic inflammatory disease (1.54 [1.03-2.30]).

Conclusion: Adolescents may require a different approach to clinical care and follow-up after PID to prevent recurrent sexually transmitted infections, recurrent PID, and unwanted pregnancies.

PATIENTS AND SETTING

We conducted a secondary analysis of data from the Pelvic Inflammatory Disease Evaluation and Clinical Health (PEACH) study, a large multicenter randomized clinical trial assessing PID treatment strategies. Although the methods used in this seminal trial have been well described in the literature,12,13 they will be briefly reviewed here. Patients aged 14 to 38 years with mild to moderate PID based on predetermined diagnostic criteria were enrolled at diagnosis at one of the 8 centers participating in the trial. The 3 required diagnostic criteria included (1) pelvic discomfort for fewer than 30 days, (2) pelvic organ tenderness on bimanual examination, and (3) leukorrhea, mucopurulent cervicitis, and/or known positive laboratory findings for Neisseria gonorrhoeae or Chlamydia trachomatis infection. Patients were excluded if they were identified as being at risk for acute morbidity in the outpatient setting (eg, pregnancy, inability to tolerate an outpatient regimen, tubo-ovarian abscess, or a potential surgical abdomen); if they had pelvic pain for more than 30 days, allergy to study drugs, an ovarian abscess, or a potential surgical abdomen); if they had been pregnant (yes or no), live birth (yes or no), ectopic or tubal pregnancies (yes or no), miscarriages (yes or no), abortions (yes or no), cervical and/or endometrial N gonorrhoeae/C trachomatis infection at baseline (yes or no), baseline endometritis (yes or no), history of PID (yes or no), level of distress if the participant could not have a child (a 10-item scale recoded into 3 categories [0–3, 4–6, and 7–10]), mean days to follow-up, adherence to medication via pill counts (yes or no), sex during the treatment window (yes or no), and partner treatment after diagnosis (yes or no).

Using these criteria, 1515 patients were eligible for participation in the study; of these, 651 (43.0%) refused participation, and, among the remaining 864 who consented to participate, 831 were randomly assigned to inpatient or outpatient antibiotic therapy (Figure 1). Refusal rates were similar to those of other studies that compared treatment strategies,13 and patients who refused to participate did not differ significantly by race, age, or clinical status. Perceived hardship for a potential hospitalization was noted as the primary reason for refusal.13 Parental consent was obtained for minors who participated in the trial.

Inpatient therapy included 48 hours of intravenous antibiotics on an inpatient unit with subsequent outpatient therapy with an oral antibiotic. Outpatient therapy included treatment with an oral antibiotic. All patients were advised to rest, notify partners of treatment, and abstain from sexual intercourse until both partners completed a course of treatment.

MEASURES

All participants completed a 20-minute baseline interview with reevaluation at 5 and 30 days from the time of enrollment and then a telephone interview every 3 to 4 months for 84 months. Data collected at the baseline interview included demographic information, reproductive health history, lifestyle habits, and details of the current clinical illness. Patients also underwent a gynecologic examination with collection of biological specimens to test for N gonorrhoeae by culture and C trachomatis by polymerase chain reaction (Roche Medical Laboratories, Burlington, North Carolina) and an endometrial biopsy for detection of infection and determination of histology consistent with endometritis.

The primary outcomes of interest were recurrent STI at 30 days and recurrent PID, chronic pelvic pain, infertility, and pregnancy at 35 and 84 months. Each of the primary outcome variables was measured as yes or no and dichotomously coded (1 or 0). Time to pregnancy and recurrent PID were also measured. Recurrent PID was self-reported and verified whenever medical records were available. As previously reported, confirmation of recurrent PID by self-reports and medical record reviews was similar.13 Infertility was defined when a sexually active patient with at least 12 months of follow-up did not report conception (a positive urine or blood test finding or a clinician’s diagnosis of pregnancy) despite rare or no use of contraceptive methods. Ectopic pregnancy was based on self-report, verified whenever possible by medical record review. Medical records were available for 45.0% of the cohort. Patients were considered to have chronic pelvic pain if pelvic pain was reported during at least 2 consecutive follow-up visits, thereby suggesting a minimum duration of pelvic pain of 6 months. Specific measures used in this analysis included demographic data, baseline reproductive health histories (ie, pregnancy history, PID history, evidence of endometritis at baseline, and level of distress if unable to have a child), sexual risk behavior (new sexual partners, number of partners in the past 4 weeks, contraceptive use in the past 4 weeks, condom use by partner in the past 4 weeks, consistent condom use, and occasional condom use), adherence data (days between enrollment and follow-up, pill counts, intercourse during treatment window, and partner treatment), short-term treatment outcomes (STI [infection with N gonorrhoeae and/or C trachomatis] at 30 days after PID treatment and condom use at 30 days), and long-term treatment outcomes (recurrent PID and/or pregnancy at 35 and 84 months).

Other variables used to assess baseline differences between the age groups included age and race, health care access, insurance status, and regular access to health care (yes or no). Other baseline reproductive health history variables included ever having been pregnant (yes or no), live birth (yes or no), ectopic or tubal pregnancies (yes or no), miscarriages (yes or no), abortions (yes or no), cervical and/or endometrial N gonorrhoeae/C trachomatis infection at baseline (yes or no), baseline endometritis (yes or no), history of PID (yes or no), level of distress if the participant could not have a child (a 10-item scale recoded into 3 categories [0–3, 4–6, and 7–10]), mean days to follow-up, adherence to medication via pill counts (yes or no), sex during the treatment window (yes or no), and partner treatment after diagnosis (yes or no).

DATA ANALYSIS

Summary statistics by adolescents and adults were generated for each of the descriptive and primary outcome variables using commercially available software (SAS, version 9.2; SAS Institute, Inc, Cary, North Carolina). Adolescents were defined as participants aged 19 years or younger and adults were defined as participants older than 19. The parent study did not find dif-
ferences between inpatient and outpatient treatment groups. However, before making comparisons across age groups, we conducted stratified within-group (adolescent and adult) analyses (not shown) to examine whether there were differences by intervention status (inpatient vs outpatient therapy) from the parent study. Baseline variables were then compared by age group strata. In all bivariate analyses, and unpaired t tests were used to evaluate differences for proportions and continuous variables, respectively. Times to recurrent PID and pregnancy were examined using Cox proportional hazards modeling adjusted for possible confounders, including history of pregnancy, history of PID, level of distress if the participant could not have additional children, consistent condom use, and treatment group.

The original data collection was approved by the University of Pittsburgh institutional review board and each associated trial site. This analysis was approved by The Johns Hopkins University School of Medicine institutional review board.

RESULTS

SELECTED DEMOGRAPHICS

Adolescents represented 25.1% of the final sample size (Table 1). The mean (SD) ages for the adolescent and adult groups were 17.9 (1.1) and 25.3 (4.7) years, respectively. Except for the age differences, patients were demographically similar. Most were of African American descent, were of low-income status as measured by insurance status (uninsured/public insurance), and reported regular access to health care. As previously reported, there were no significant differences between the inpatient and outpatient trial groups. Within age groups, adolescents and adults were also demographically similar regardless of randomization assignment.

REPRODUCTIVE HEALTH HISTORY AND RISK BEHAVIORS

Adolescents were less likely to have a history of pregnancy, live birth, abortion, or previous PID but were more likely to report higher levels of distress if unable to have a child. There were no significant differences in the numbers of new sexual partners or of partners in the past 4 weeks or contraceptive use in the past 4 weeks between the adolescents and adults. However, adolescents were more likely to report condom use by male partners within the past 4 weeks and to be engaging in consistent (10 of 10 times) condom use.

Table 1. Selected Baseline Demographics, Reproductive Health History/Status, and Reported Risk Behaviors by Group Statusa

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Adolescents (n=209)</th>
<th>Adults (n=622)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age, mean (SD), y</td>
<td>17.9 (1.1)</td>
<td>25.3 (4.7)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>158 (75.6)</td>
<td>463 (74.4)</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>32 (15.3)</td>
<td>101 (16.2)</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>10 (4.8)</td>
<td>44 (6.8)</td>
<td>.54</td>
</tr>
<tr>
<td>Native American/Alaskan native/Asian</td>
<td>9 (4.3)</td>
<td>17 (2.7)</td>
<td></td>
</tr>
<tr>
<td>Health care access and insurance status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health care insurance</td>
<td>101 (54.9)</td>
<td>292 (51.0)</td>
<td>.35</td>
</tr>
<tr>
<td>Regular access to health care</td>
<td>124 (67.4)</td>
<td>415 (72.4)</td>
<td>.19</td>
</tr>
<tr>
<td>Insurance status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uninsured</td>
<td>83 (45.1)</td>
<td>281 (49.0)</td>
<td></td>
</tr>
<tr>
<td>Private insurance</td>
<td>32 (17.3)</td>
<td>82 (14.3)</td>
<td>.44</td>
</tr>
<tr>
<td>Public insurance</td>
<td>68 (37.0)</td>
<td>210 (36.6)</td>
<td></td>
</tr>
<tr>
<td>Reproductive health history/status</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Ever been pregnant</td>
<td>109/209 (52.2)</td>
<td>516/618 (83.5)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Live births</td>
<td>83/209 (39.7)</td>
<td>453/618 (73.3)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Ectopic pregnancies</td>
<td>3/209 (1.4)</td>
<td>36/617 (5.8)</td>
<td>.01</td>
</tr>
<tr>
<td>Miscarriages</td>
<td>34/209 (16.3)</td>
<td>164/618 (26.5)</td>
<td>.003</td>
</tr>
<tr>
<td>Abortions</td>
<td>29/209 (13.9)</td>
<td>172/618 (27.8)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Positive cervical and/or endometrial Neisseria gonorrhoeae / Chlamydia trachomatis</td>
<td>110/174 (63.2)</td>
<td>195/477 (40.8)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Evidence of endometritis</td>
<td>92/164 (56.1)</td>
<td>219/490 (44.7)</td>
<td>.01</td>
</tr>
<tr>
<td>History of pelvic inflammatory disease</td>
<td>52/207 (25.1)</td>
<td>199/615 (32.4)</td>
<td>.051</td>
</tr>
<tr>
<td>Level of distress if you could not have a child</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-3</td>
<td>16 (15.5)</td>
<td>93 (32.3)</td>
<td></td>
</tr>
<tr>
<td>4-6</td>
<td>13 (12.6)</td>
<td>35 (12.2)</td>
<td>.004</td>
</tr>
<tr>
<td>7-10</td>
<td>74 (71.8)</td>
<td>160 (55.6)</td>
<td></td>
</tr>
<tr>
<td>Sexual risk behavior</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New sexual partner</td>
<td>26 (12.4)</td>
<td>52 (8.4)</td>
<td>.08</td>
</tr>
<tr>
<td>No. of sexual partners in past 4 wk, mean (SD)</td>
<td>1.3 (3.9)</td>
<td>1.0 (1.2)</td>
<td>.33</td>
</tr>
<tr>
<td>Any contraceptive use in past 4 wk</td>
<td>131/175 (74.9)</td>
<td>377/528 (71.4)</td>
<td>.38</td>
</tr>
<tr>
<td>Any condom use by male partner in past 4 wk</td>
<td>112/176 (63.8)</td>
<td>259/528 (49.1)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Consistent condom use (10 of 10 sexual encounters)</td>
<td>34/176 (19.3)</td>
<td>59/528 (11.2)</td>
<td>.006</td>
</tr>
</tbody>
</table>

aUnless otherwise indicated, data are expressed as number (percentage) of participants. Percentages have been rounded and may not total 100. Adolescents are aged 19 years or younger; adults, older than 19 years.
Table 2. Patient Adherence and Short-term Outcomes by Group Statusa

<table>
<thead>
<tr>
<th>Adherence Measure</th>
<th>Adolescents (n=209)</th>
<th>Adults (n=622)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time from enrollment to first follow-up, mean (SD), d</td>
<td>6.2 (3.5)</td>
<td>6.2 (3.3)</td>
<td>.87</td>
</tr>
<tr>
<td>Pills (2 tablets/14 visits)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total No. of pills taken, mean (SD)</td>
<td>27.6 (1.7)</td>
<td>27.5 (2.5)</td>
<td>.25</td>
</tr>
<tr>
<td>Median</td>
<td>28.0</td>
<td>28.0</td>
<td></td>
</tr>
<tr>
<td>Adherence, %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>98.7 (6.1)</td>
<td>98.2 (8.9)</td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Sex during treatment window</td>
<td>28/184 (15.2)</td>
<td>84/571 (14.7)</td>
<td>.85</td>
</tr>
<tr>
<td>Partner treatment after PID diagnosis</td>
<td>42/140 (29.8)</td>
<td>137/469 (29.2)</td>
<td>.88</td>
</tr>
<tr>
<td>Cervical and/or endometrial Neisseria gonorrhoeae/Chlamydia trachomatis at 30 d after treatment</td>
<td>19/95 (20.0)</td>
<td>13/250 (5.2)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Self-report of patient/partner STI since diagnosis</td>
<td>60/144 (41.7)</td>
<td>175/442 (39.6)</td>
<td>.66</td>
</tr>
<tr>
<td>Condom use at 30 d</td>
<td>123/138 (89.1)</td>
<td>281/387 (72.6)</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

Abbreviations: PID, pelvic inflammatory disease; STI, sexually transmitted infection.

Table 3. Adverse Reproductive Health Outcomes After PID at 35 and 84 Months and Time to Pregnancy and Recurrent PIDa

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Adolescents</th>
<th>Adults</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>At 35 mo</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronic pelvic pain</td>
<td>58/192 (30.2)</td>
<td>180/557 (32.3)</td>
<td>.55</td>
</tr>
<tr>
<td>Infertility</td>
<td>34/193 (17.6)</td>
<td>104/567 (18.3)</td>
<td>.82</td>
</tr>
<tr>
<td>Pregnancy</td>
<td>109/207 (52.7)</td>
<td>229/601 (38.1)</td>
<td>.003</td>
</tr>
<tr>
<td>Recurrent PID</td>
<td>36/207 (17.4)</td>
<td>81/601 (13.5)</td>
<td>.17</td>
</tr>
<tr>
<td>At 84 mo</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronic pelvic pain</td>
<td>82/204 (40.2)</td>
<td>259/595 (43.5)</td>
<td>.41</td>
</tr>
<tr>
<td>Infertility</td>
<td>36/207 (17.4)</td>
<td>116/610 (19)</td>
<td>.60</td>
</tr>
<tr>
<td>Pregnancy</td>
<td>149/207 (72.0)</td>
<td>321/610 (52.6)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Recurrent PID</td>
<td>50/199 (25.1)</td>
<td>118/590 (20.3)</td>
<td>.13</td>
</tr>
<tr>
<td>Time to event, mean (SD), mo</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pregnancy</td>
<td>33.0 (26.6)</td>
<td>39.8 (28.9)</td>
<td>.003</td>
</tr>
<tr>
<td>Recurrent PID</td>
<td>50.4 (29.4)</td>
<td>52.0 (29.3)</td>
<td>.52</td>
</tr>
</tbody>
</table>

Abbreviation: PID, pelvic inflammatory disease.

Table 4

<table>
<thead>
<tr>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>.001</td>
</tr>
</tbody>
</table>

Abbreviations: PID, pelvic inflammatory disease.  

BASELINE AND LONGITUDINAL REPRODUCTIVE HEALTH OUTCOMES

There were no differences in the mean days to follow-up, adherence to medication via pill counts, sexual intercourse during the treatment window, or partner treatment after diagnosis (Table 2). However, adolescents were significantly more likely than adults to have evidence of endometritis and positive results of STI testing (N gonorrhoeae/C trachomatis infection) at baseline (63.2% vs 40.8%) (Table 1) and at 30 days (20.0% vs 5.2%) (Table 2).

As previously reported,13 at 35 months, 31.8% of participants had chronic abdominal pain, 18.2% were categorized as infertile, 11.8% became pregnant, and 14.5% experienced recurrent PID. At 84 months, 42.7% of participants reported chronic abdominal pain, 18.6% were categorized as infertile, 57.2% became pregnant, and 21.3% had recurrent PID. There were no significant group differences in chronic abdominal pain, infertility, and recurrent PID at either time point, but adolescents were more likely to have a pregnancy at both time points (Table 3).

Graphical displays of the survival distribution against the times to pregnancy (Figure 2) and recurrent PID (Figure 3) show clear deviation between the 2 groups of study participants over time. Adjusted hazards models controlling for history of pregnancy, history of PID, level of distress if infertile, consistent condom use, and treatment group demonstrate that adolescents had shorter times to recurrent PID (hazard ratio, 1.54 [95% confidence interval, 1.03-2.30]; P=.03) and pregnancy (1.48 [1.18-1.87]; P < .001) compared with adult women (Table 3).

Two post hoc power analyses were conducted. The post hoc analysis for time to recurrent PID suggested 70% power for bivariate analyses, declining to 43% for the multivariable analysis with 5 confounders to detect a true hazard ratio of about 1.30. The post hoc analysis for time to recurrent pregnancy suggested greater than 80% power for bivariate and multivariable analyses to detect a true hazard ratio of about 1.60.

This study supports previous research by Westrom and colleagues6 demonstrating that women experience significant reproductive health sequelae after a PID diagnosis.

During the 84-month study, 42.7% of patients in this US sample experienced chronic abdominal pain, 18.6% experienced infertility, and 21.3% had recurrent PID. Although adolescents reported more consistent condom use than adults at baseline and at follow-up, they were more likely to be infected with an STI at baseline and at 30 days and to have a shorter time to development of PID, further risking preservation of their reproductive function.

Although more than half the patients experienced a pregnancy, the rates of infertility among this mostly minority, low-income population of women were significant, particularly because these data derive from patients with the least severe symptoms (mild to moderate disease). The STI findings in adolescent girls ap-
peared counterintuitive given the reports of consistent condom use. These findings may reflect the highly contextual and evolving nature of condom use based on relationship status.\textsuperscript{26, 27} Recent studies have suggested that reports of unprotected vs protected sexual intercourse do not correlate well with the presence of semen biomarkers in adult women.\textsuperscript{16} The social desirability bias that is likely driving this observation may be even greater when adolescents are questioned about sexual practices compared with adult women. Adult women are also more likely to be married or in a stable relationship, which may explain lower rates of condom use and STIs. Ultimately, these observations likely reflect the epidemiology of STIs among adolescents and young adults and the increased likelihood of encountering a partner with an STI over time.\textsuperscript{19} This analysis does not examine partner factors, but examination of relationship concurrency, disclosure, and partner treatment after each STI would be important factors to consider in future work.

Although adverse outcomes were similar by treatment arm in the entire cohort,\textsuperscript{13, 20} our main goal was to determine whether, by comparing adolescent-specific outcomes with those of the adults, additional follow-up recommendations should be made to optimize outpatient care for adolescents facing a PID diagnosis. These data suggest that adolescents may be more likely to experience a pregnancy, have recurrent STIs, and have a shorter time to development of recurrent PID than adult women. The pregnancy finding is not surprising because previous studies have suggested that girls who perceive an impairment of their fertility are less likely to use contraception,\textsuperscript{21} that few adolescents diagnosed as having PID in observational trials are using contraception,\textsuperscript{10} and that adolescents often believe that prevention of infertility is beyond their control.\textsuperscript{22} These data, combined with our earlier work demonstrating the disparities in health care delivery for PID in pediatric ambulatory settings, the difficulty with adherence faced by many adolescents,\textsuperscript{8, 10} and recurrent rates of STIs and PID after a diagnosis of PID,\textsuperscript{3} suggest that health service delivery should be expanded for prevention of recurrent STIs, PID, and teen pregnancy through risk reduction interventions.

The findings from this study must be considered in light of several general limitations. The sample primarily consisted of low-income African American women and may not be generalizable to other patients in other settings. However, research in this population is important given the documented racial/ethnic health disparities associated with STIs, PID,\textsuperscript{23} and infertility in the United States.\textsuperscript{23- 26} There is limited variability of the adolescent cohort because this sample primarily consists of older adolescents and young adults as indicated by the mean (SD) age of the adolescent sample. Younger adolescents and/or adolescents who refused to participate because they were seeking confidential services may have differed systematically from participants in ways that could have resulted in more negative PID outcomes. The adolescents in this sample were, however, clearly different in behavior and outcome than the adult sample; thus, the stratification and findings from this work are still important.

Although the study findings suggest high adherence to medication regimens, the measure of adherence for most patients in the study was limited to pill counts performed at clinic visits. Thus, differences in adherence between adolescents and adults may exist, but we are unable to determine them based on available data. Given that this was a randomized controlled trial, it is possible that the participants in the study were dissimilar to patients in reality settings. As an example, previous studies have demonstrated very low contraceptive use rates among adolescents with PID,\textsuperscript{10, 27} but more than 70% of the participants in both groups reported using some form of contraception. This might suggest a slightly lower risk
profile for women in this sample. However, the PEACH study represents the most comprehensive longitudinal data with US women affected by PID and has provided excellent efficacy data on outpatient treatment under the best possible conditions and should be used as a template for translational work that establishes the effectiveness of outpatient treatment approaches among the high-risk populations often affected by PID.

The CDC has been clear in that health care providers working with adolescents diagnosed as having PID should engage in careful, developmentally appropriate, and non-judgmental discussions aimed at reduction of high-risk behaviors in adolescents. The findings from this research suggest that, although adolescent-specific PID management needs to include more aggressive risk reduction interventions to prevent subsequent STIs, PID, and teen pregnancy after a PID diagnosis, a reduction in PID-associated chronic abdominal pain and infertility among all women is also needed.

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